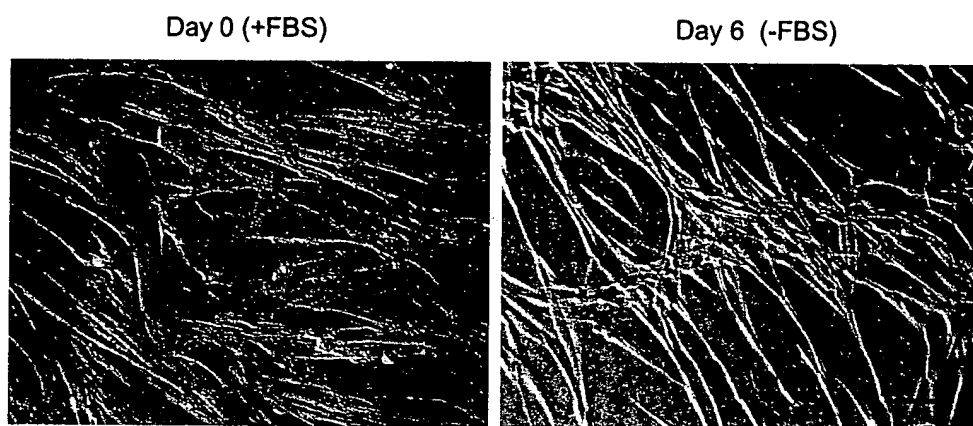
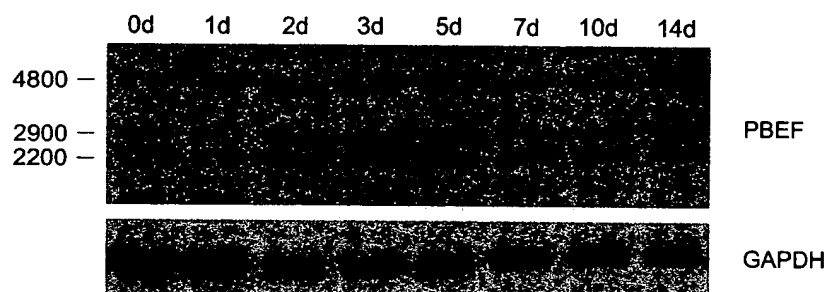


A



B



C

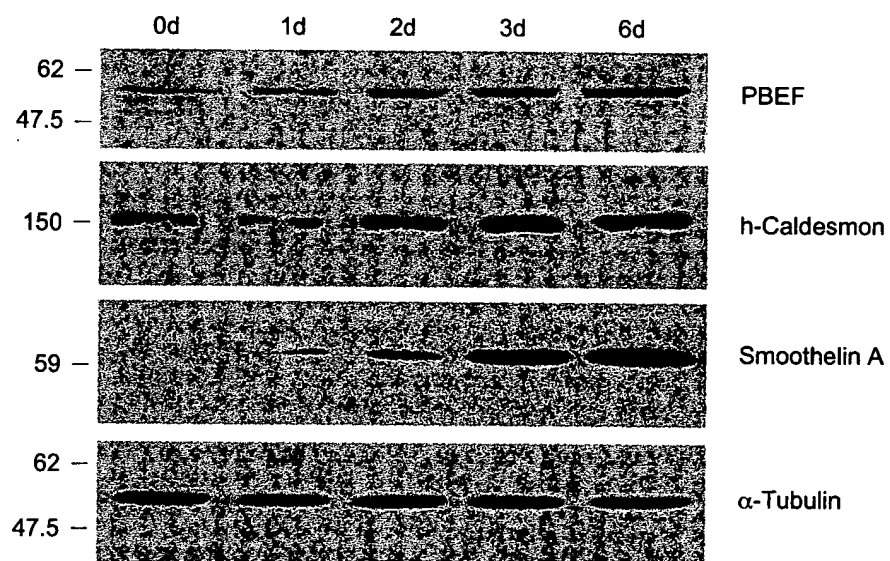
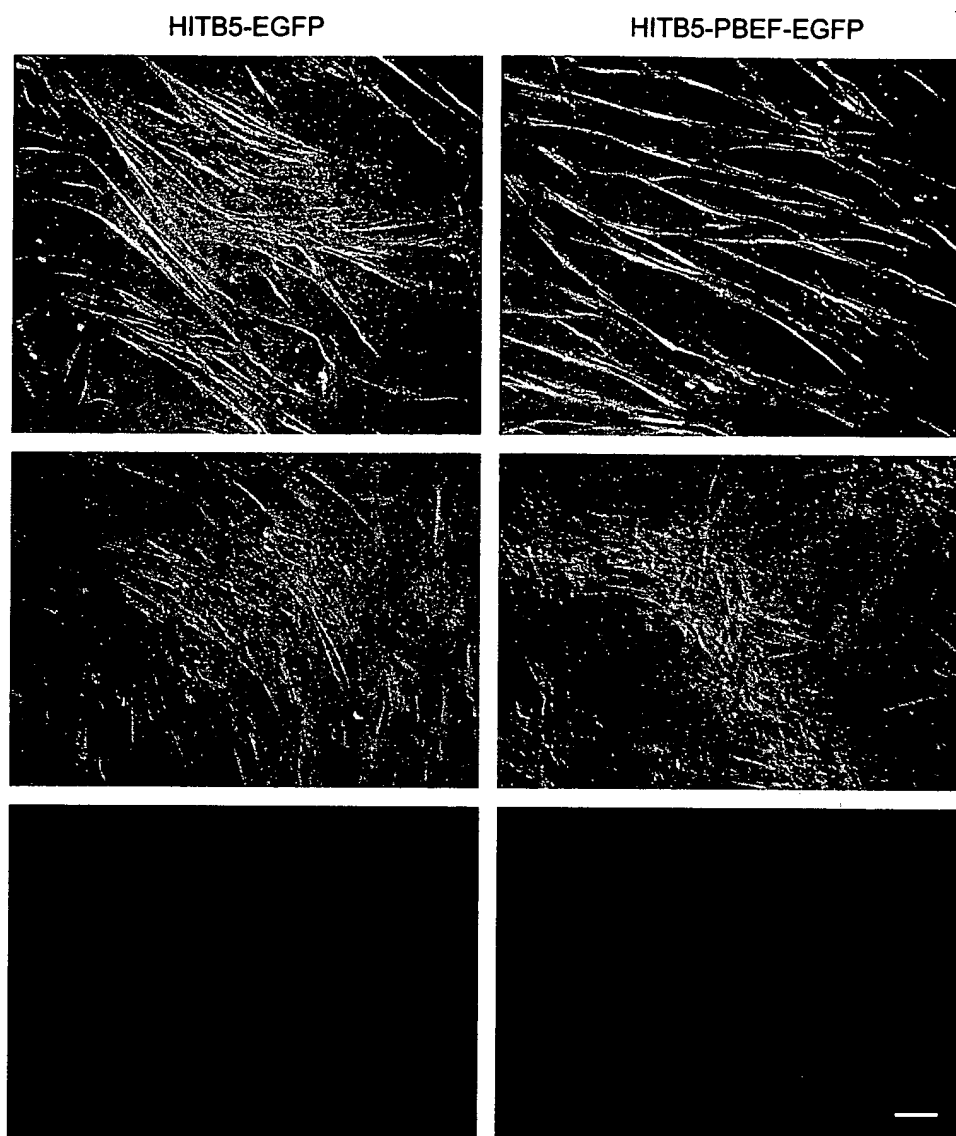


Figure 1

A



B

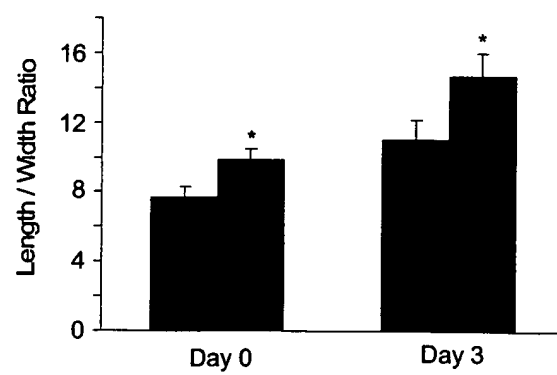


Figure 2

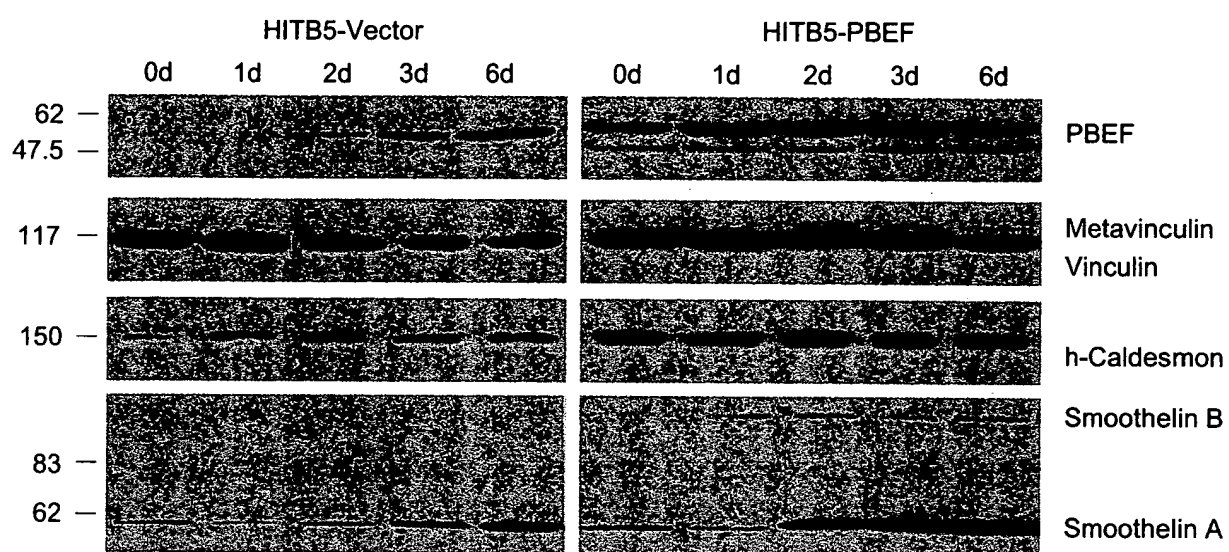


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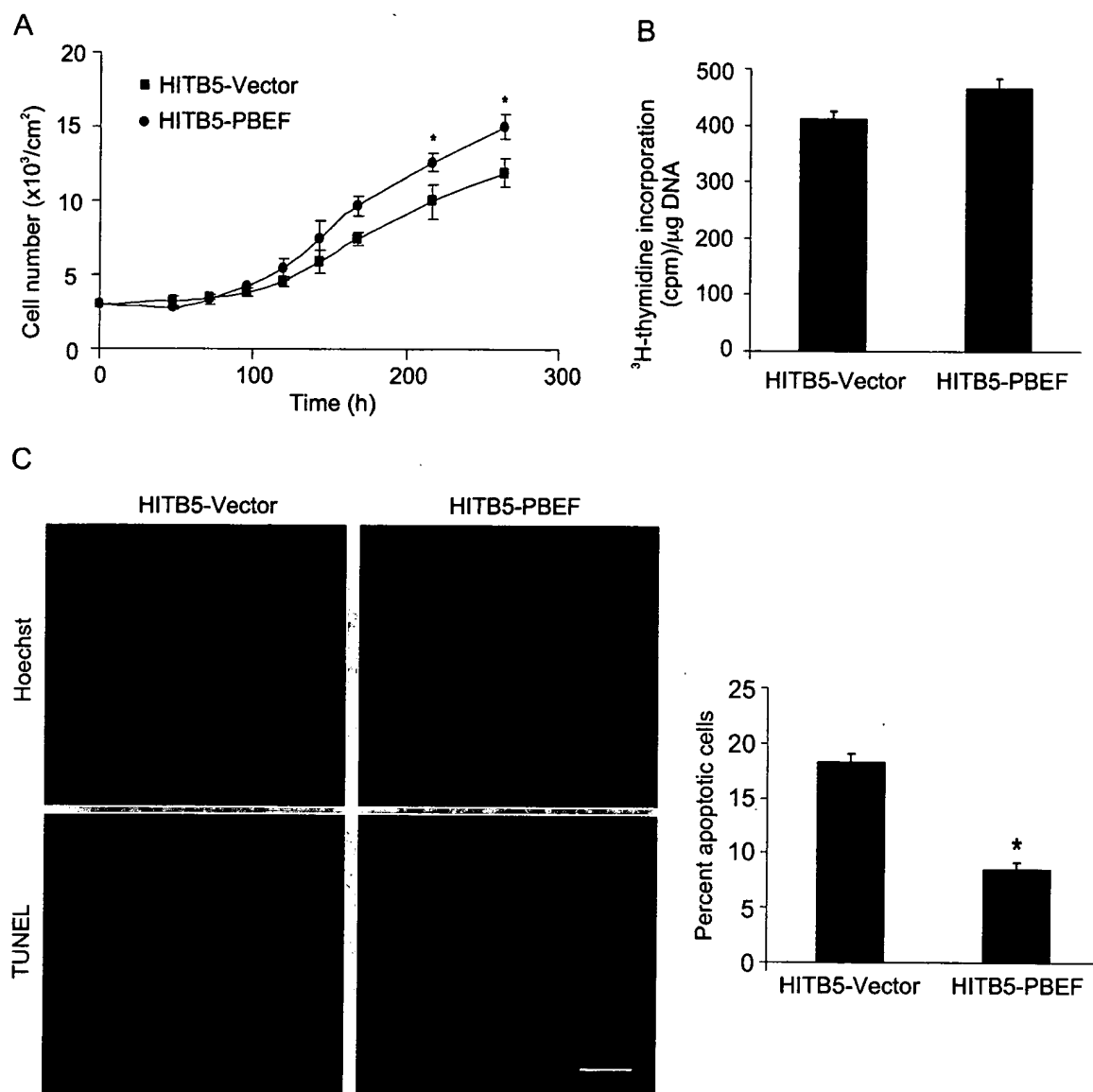


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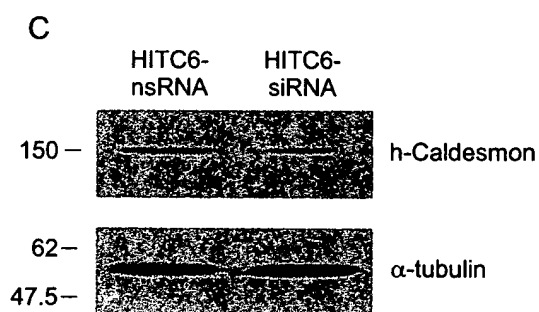
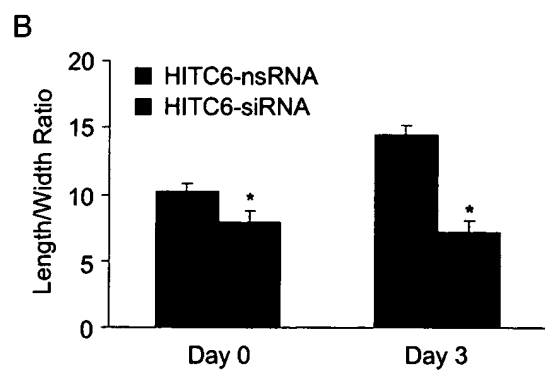
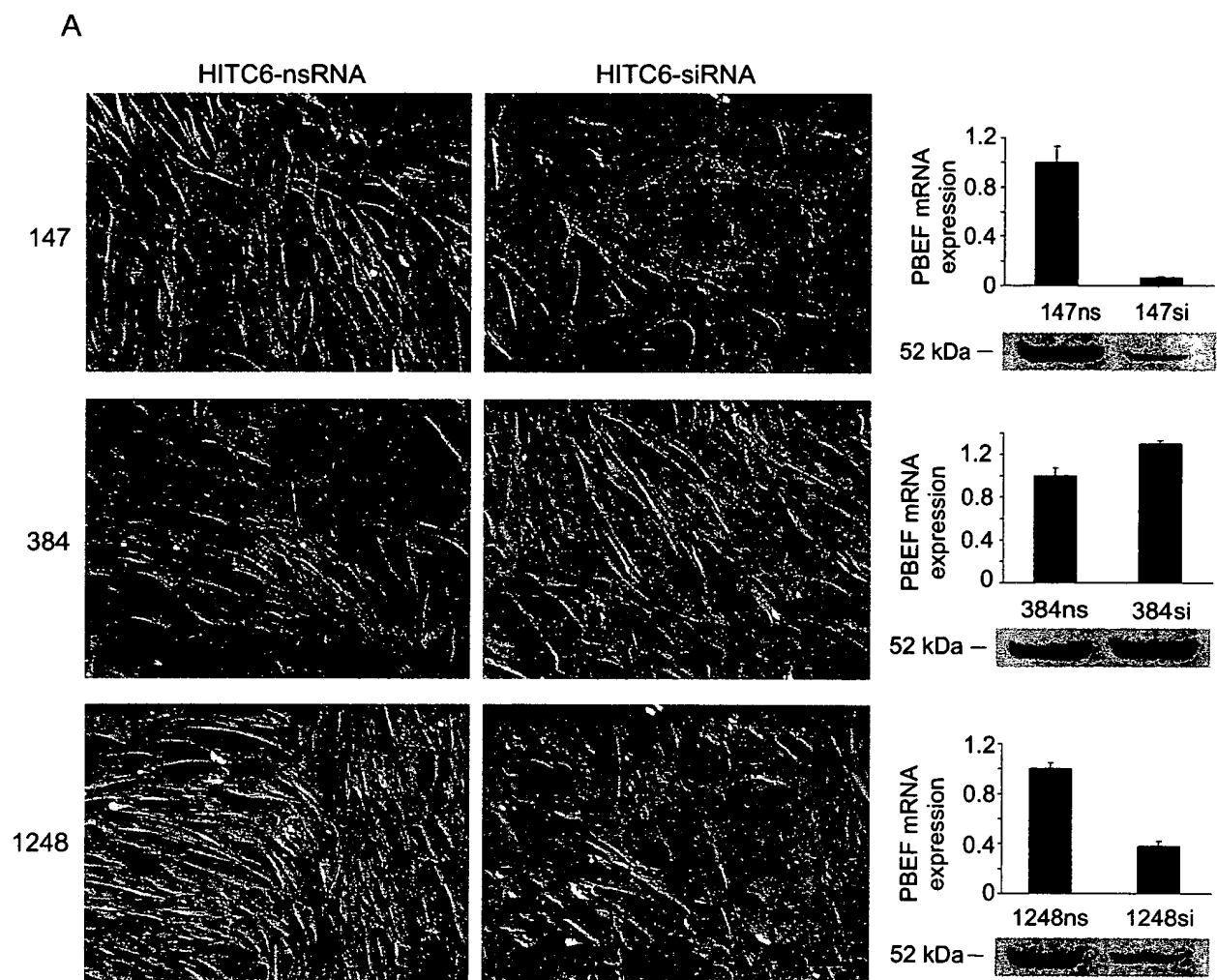


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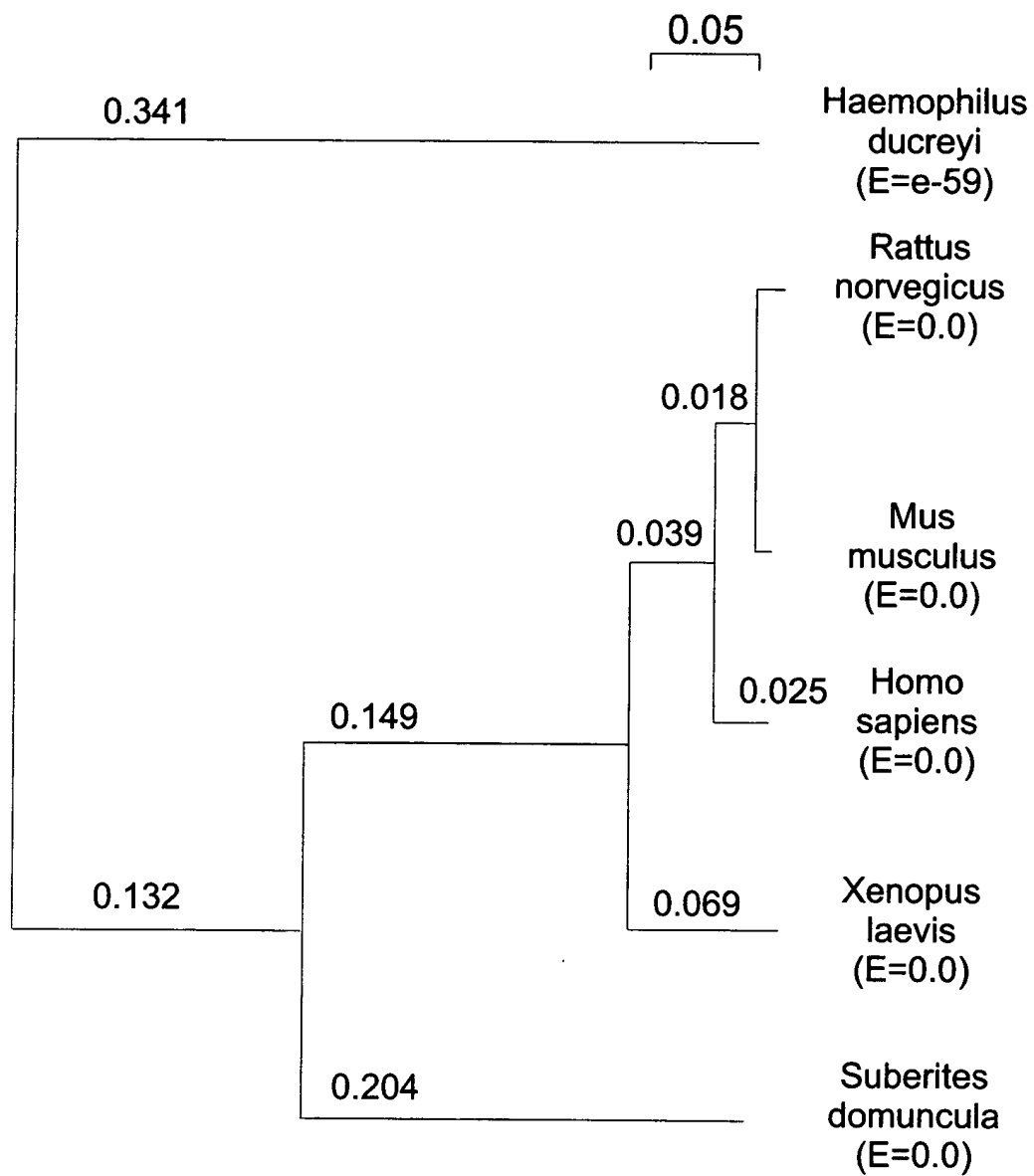


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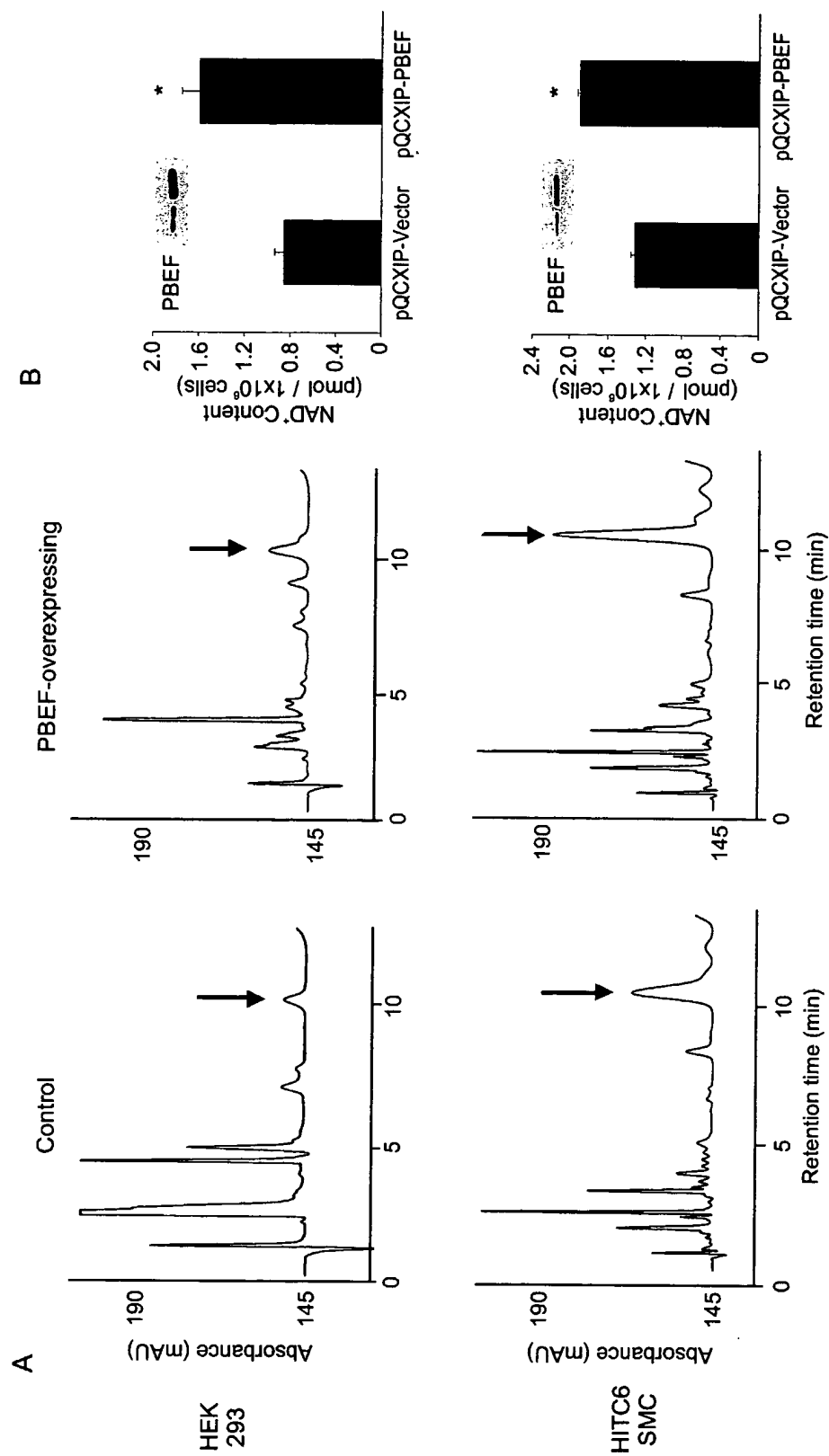


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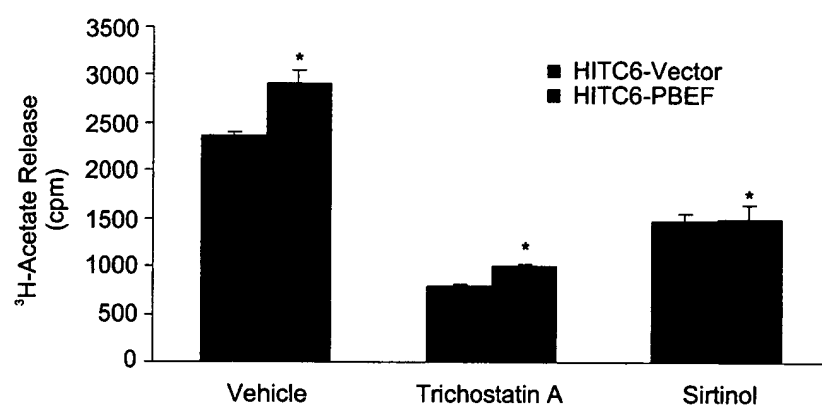


Figure 8



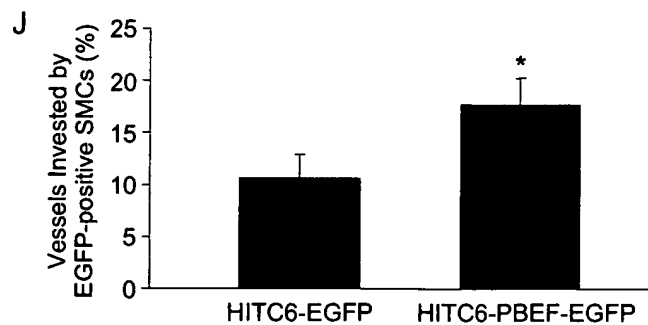
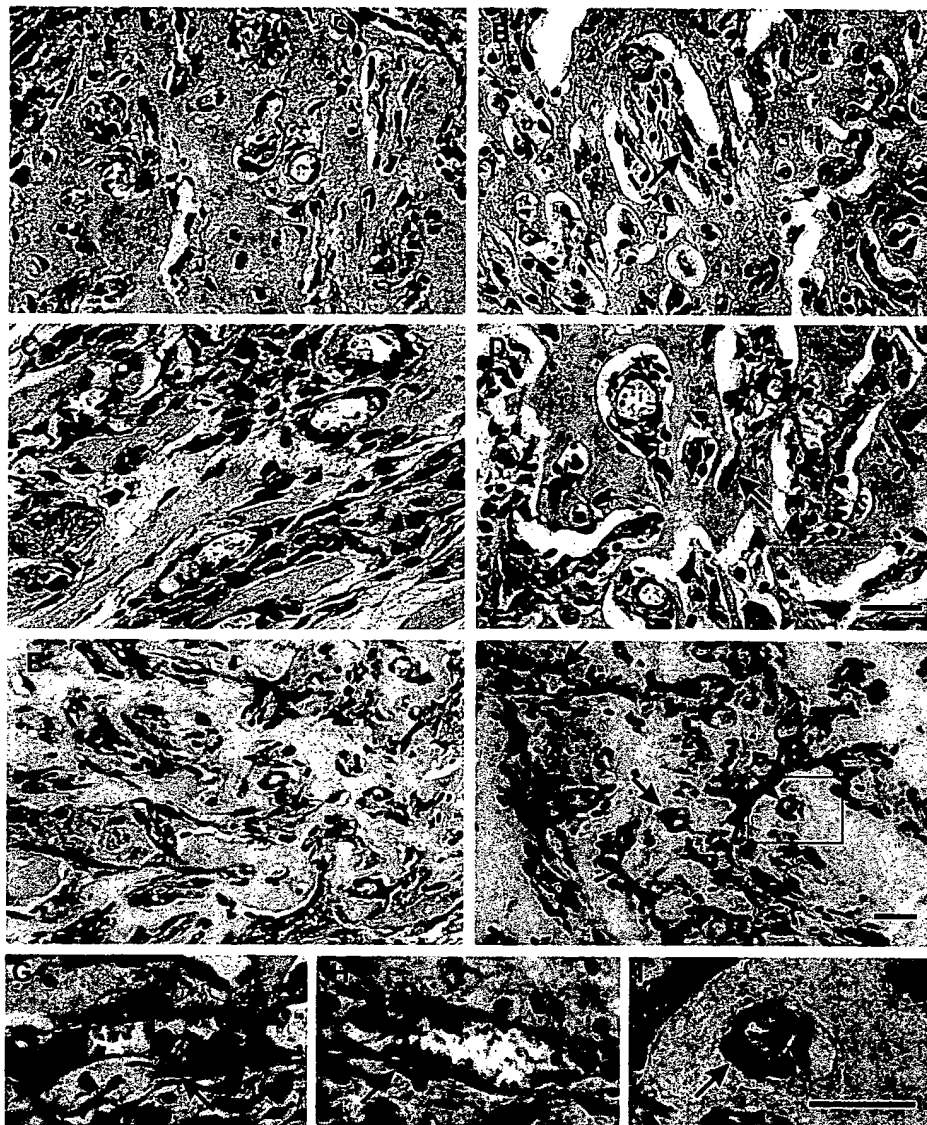
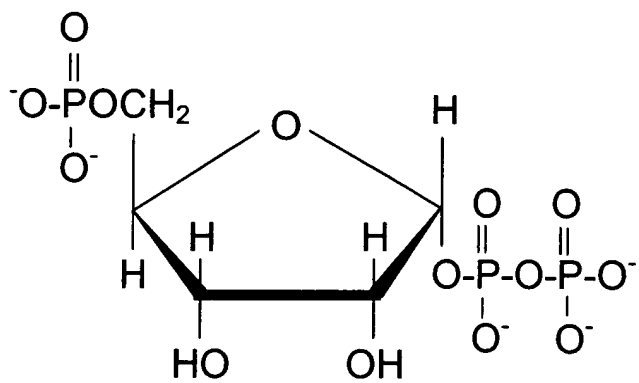


Figure 9



5-phosphoribosyl-pyrophosphate

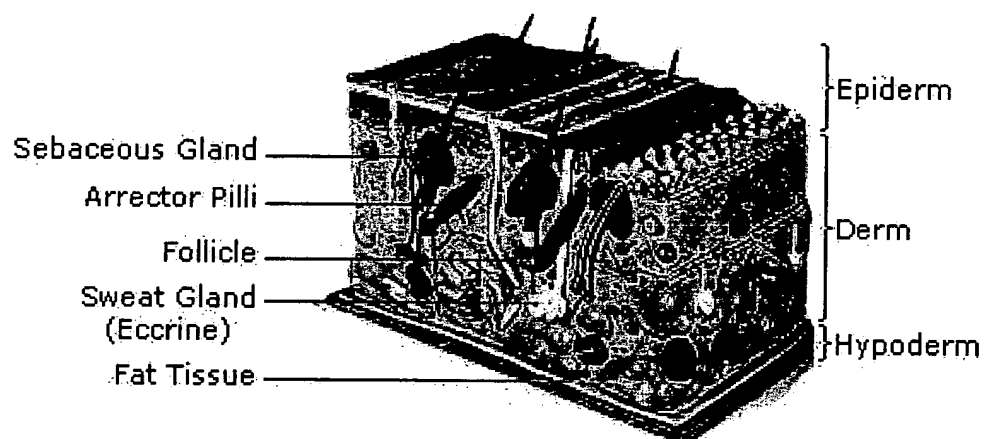
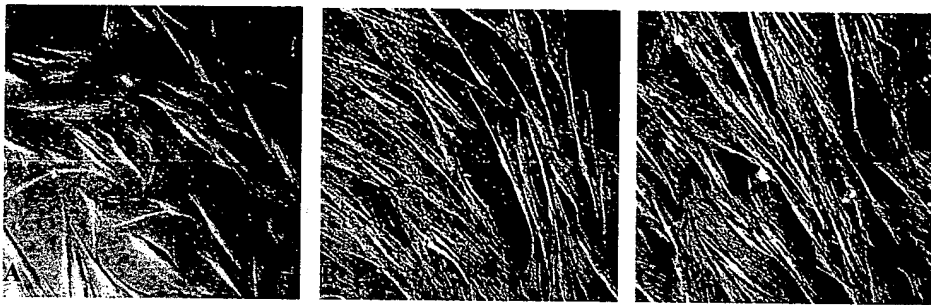
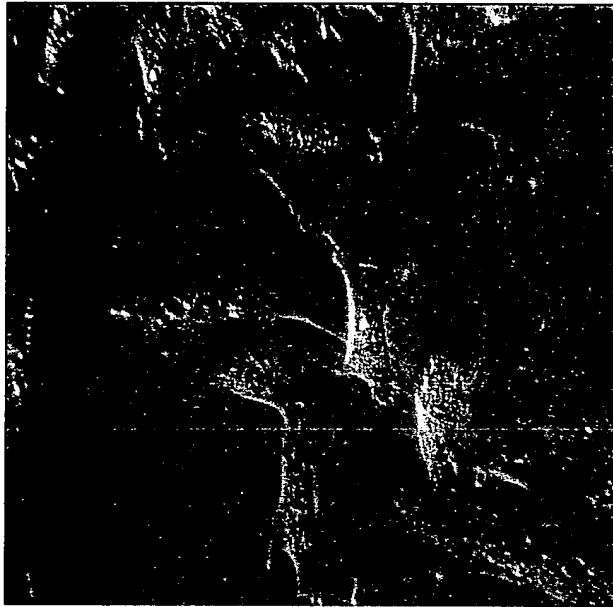


Figure 11

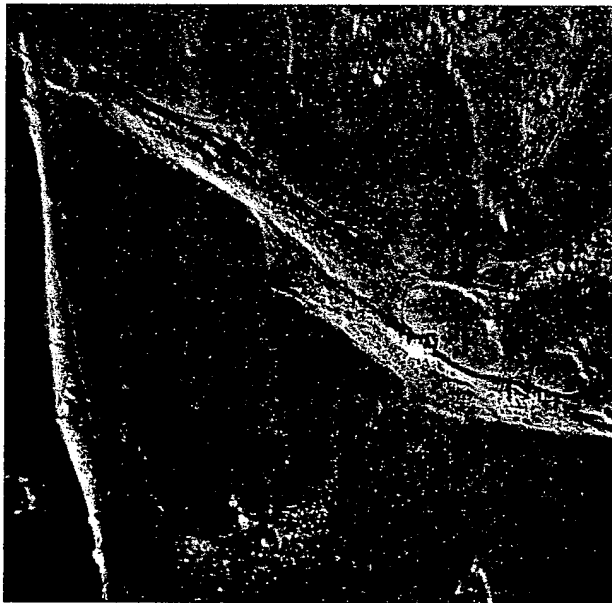


**Figure 12**

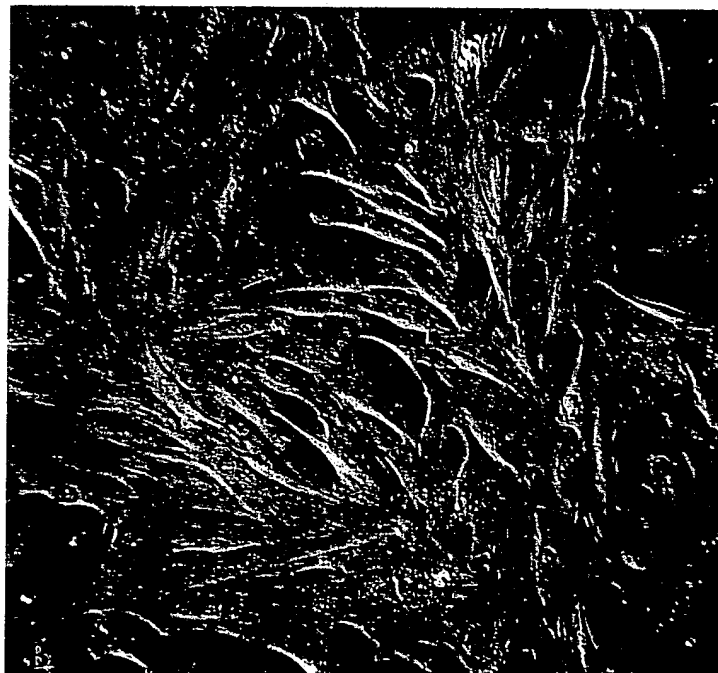
**A**



**B**

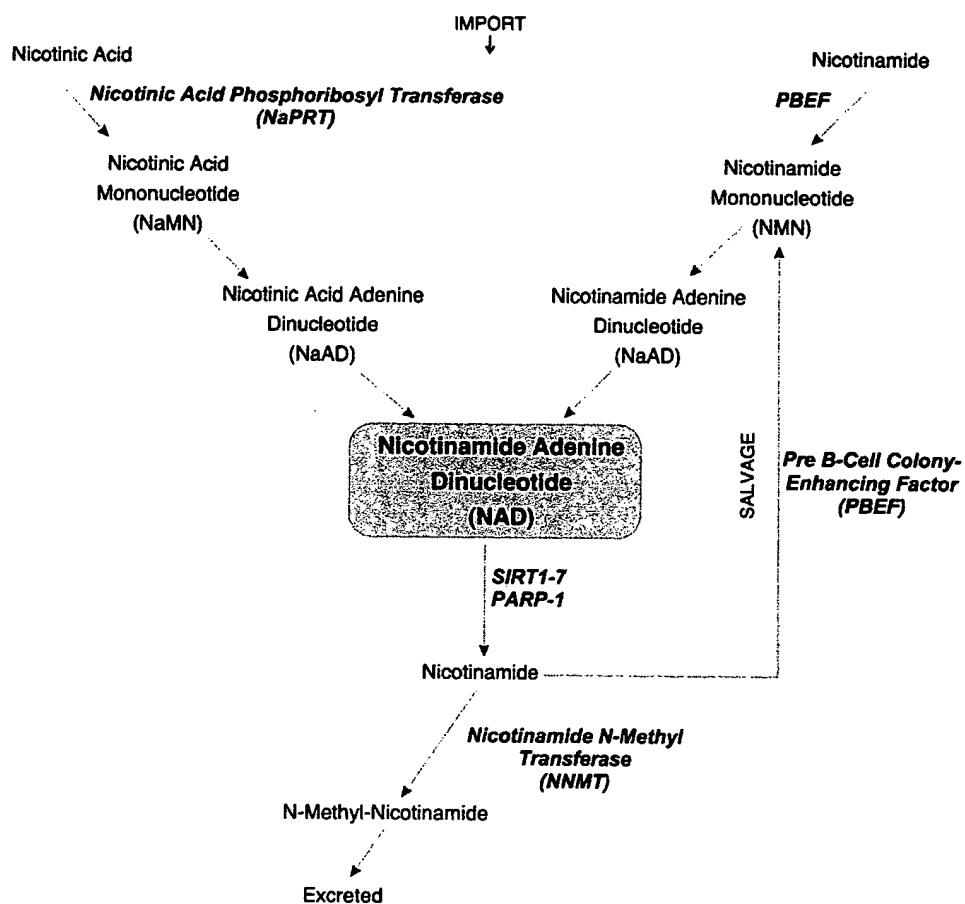


**Figure 13**



**Figure 14**

J. Geoffrey Pickering

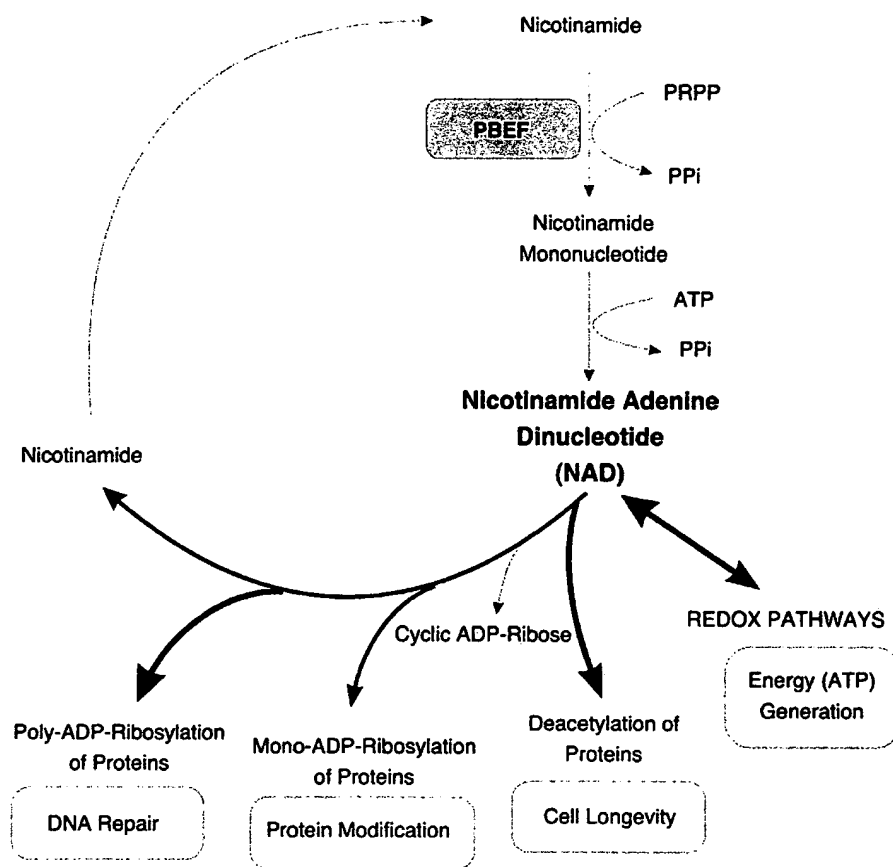


#### NAD Biosynthesis

NAD can be synthesized from precursors that are transported into the cell, including nicotinic acid and nicotinamide. NAD is consumed during vital reactions that are mediated by SIRT's and PARP.

Regeneration of NAD from the accumulated nicotinamide is, in mammals, entirely dependent on PBEF. NNMT can clear excess nicotinamide but not regenerate NAD.

Figure 15



**Figure Utilization and Regeneration of NAD**

NAD is essential for redox pathways including oxidative phosphorylation, but these do not consume NAD. In contrast, NAD is consumed during vital cellular reactions such as DNA repair, protein modification, generating the signaling molecule cADP ribose, and NAD-dependent deacetylation of proteins. Maintenance of these reactions requires resynthesis of NAD from nicotinamide (salvage). PBEF is the rate-limiting enzyme for this salvage pathway.



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